

I CLAIM

1. A computer audio input/output device comprising:

a personal computer having an operating system and a full duplex voice sound card;

5 the sound card having a first standard mini-jack input, and having a second standard mini-jack output;

a first software device respectively providing audio input and output to the respective first and second jacks;

10 an electronic interface unit having, at least two standard mini-jack plugs, and a standard telephone jack plug;

a second software device responsive to inputs commanded by the telephone via the electronic interface device;

15 a signal conversion circuit connecting a voice signal from the standard telephone jack to the input mini-jack, and connecting an audio signal from the output mini-jack to the standard telephone jack plug.

2. A Voice over Internet Protocol device comprising:

a personal computer having an operating system, Serial Bus port, an internet connection, and a full duplex voice sound card;

20 the sound card having a first standard mini-jack input, and having a second standard mini-jack output;

a first software device respectively providing audio input and output to the respective first

and second jacks;

a second software device having a Voice over Internet Protocol production module to the Internet via the Internet connection, and a Voice over Internet Protocol reception module from the Internet via the Internet connection;

5 an electronic interface unit having, at least two standard mini-jack plugs, and a standard telephone jack plug;

a signal conversion circuit connecting a voice signal from the standard telephone jack to the input mini-jack, and connecting an audio signal from the output mini-jack to the standard telephone jack plug.

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3. The Voice over Internet Protocol device of claim 2 further comprising a Serial Bus port such as USB/PS2 plug and the operative connection further comprising a power conversion circuit connecting an electrical power signal from the computer's Serial Bus port to the standard telephone jack plug.

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4. The Voice over Internet Protocol device of claim 2 further comprising an application program;

the application program having a software database of VoIP addresses and telephone numbers,

20 the application program having a communications port monitoring module able to open a duplex voice over internet protocol connection to the internet and able to open a duplex voice

connection to a Public Switched Telephone Network,

the application program having a detection module able to process a DTMF connection request of a device attached to the standard telephone jack to a selected address.

5 5. The Voice over Internet Protocol device of claim 2 wherein the electronic interface unit further comprises an Electrical Magnetic Interference / Radio Frequency Interference (EMI/RFI) suppression module that protects the interface unit and Personal Computer from EMI/RFI noise from the environment in both radiated and conducted modes.

10 6. The Voice over Internet Protocol device of claim 2 wherein the electronic interface unit further comprises a power limit module;

a power limit module providing protection to the electronic interface unit and personal computer from any voltage above 6.5 Vdc.

15 7. The Voice over Internet Protocol device of claim 2 wherein the electronic interface unit further comprises a coupler module;

a coupler module providing a bi-directional signal split of unidirectional signals of the speaker and microphone jacks of the sound card of the computer,

the coupler module's electronic circuit following the formula,

20 $V_{mic} = V_{r-t} - V_{spk} - V_{dc}$ and $V_{r-t} = V_{ring} - V_{tip} = V_{rx} + V_{tx} + V_{dc}$

wherein;

$V_{tx} = V_{speaker} = V_{spk},$

$V_{rx} = V_{microphone} = V_{mic},$

$V_{dc} = 5V_{dc}.$

- 5 8. The Voice over Internet Protocol device of claim 2 wherein the electronic interface module further comprises a selector module;
- the selector module including a DTMF detector, a ringer, and a three position switch,
- wherein in the first position, the standard telephone jack is connected to the computer for VoIP communications; and
- 10 wherein in the second position, the standard telephone jack is connected to a PSTN service; and
- wherein in the third position, the standard telephone jack is connected to both the PSTN service and the computer for conference calling spanning both PSTN service and VoIP service.
- 15 9. The Voice over Internet Protocol device of claim 8, wherein the switch further comprises a DTMF detector able to receive DTMF codes from the standard telephone jack and alter the position of the switch in response to such DTMF codes.
10. The Voice over Internet Protocol device of claim 9, wherein the selector module further
- 20 includes a database of telephone numbers in the database, indicating whether VoIP or PSTN is the preferred communication route for a given telephone number.

11. The Voice over Internet Protocol device of claim 2 further comprising a POTS telephone (typically with 600 ohms impedance).

5 12. The Voice over Internet Protocol device of claim 3, wherein a detection module carries out the following steps:

1) Use sound card to track audio stream input from the electronic interface unit;

2) Form a first array of buffers with the audio stream in the form of a complex number representing Frequency and Volume;

10 3) Perform a Fast Fourier Transform on each buffer in the first array and use the product to fill a corresponding buffer in a second array;

4) Select products at least equal to a predefined threshold value;

5) Screen the selected products for two maximum values;

6) Associate the two maximum product values with the DTMF digit corresponding
15 to the frequency combination of the two maximum product values, repeating steps 5 and 6 until such association is made;

7) Raise an event to the application program.

13. A computer system comprising:

20 A PC having a full duplex voice card and having a USB or PS2 port and an operating system

and a communication port;

an operative physical connection from the PC communication port to a cordless telephone;

5 an application program within such PC having a module to provide operative communication to the cordless telephone, and having a module to control communications and dialing of the telephone;

a computer network connection;

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wherein the application program has a monitoring module responsive upon receiving a communication request from the telephone to open a duplex voice connection of the telephone to the network.

15 14. The computer system of claim 13, wherein the operative physical connection further comprises a standard telephone jack at one end and a microphone jack and a speaker jack at the other end, the telephone being plugged into the standard POTS telephone jack and the microphone and speaker jacks being plugged into the computer, the respective jacks being in a tuned connection.

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15. The computer system of claim 13, wherein the monitoring module further comprises a

database of VoIP and PSTN addresses, and wherein the monitoring module further comprises a DTMF detection module, the database being responsive to the DTMF detection module.

16. The computer system of claim 13, wherein the application program further comprises a network monitoring module able to monitor the network connection and indicate reception of an incoming VoIP communication from the network, the indication being made at one member selected from the group consisting of: the PC, the telephone, and combinations thereof.

17. The computer system of claim 13, wherein the application program further comprises a telephone service module providing at least one member selected from the group consisting of: prompting of callers, caller identification, message recording, ring status indicators, busy status indicators, no signal status indicators, error indicators, and combinations thereof.

18. The computer system of claim 15, wherein the application program further comprises a control module responsive to the DTMF detection module, the application program functioning being responsive to the control module.

19. The computer system of claim 15, wherein the DTMF detection module is further responsive to DTMF commands in which one of the DTMF frequencies is 1633 Hz.

20. The computer system of claim 13, wherein the operative connection further comprises:

an operative connection to a PSTN telephone network, the operative connection having parallel connections to the PC and to the PSTN telephone network.